

What is claimed is:

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1. A solid-state imaging device comprising:  
a pixel unit constituted by a two-dimensional array of pixels for generating charge in correspondence to received light and accumulating the charge for a predetermined period of time;

a vertical transfer unit for vertically transferring charge from the pixels in the pixel unit, a horizontal transfer unit for horizontally transferring charge from the vertical transfer unit;

shift gates each provided between each pixel and the vertical transfer unit for reading out the charge in the pixels to the vertical transfer unit, gate electrodes for controlling the shift gates; and

a plurality of lead lines and a plurality of connection terminals for connecting the gate electrodes to an external circuit,

the gate electrodes within successive pixel rows belonging to each coset of modulo  $N$  ( $N$  being a predetermined natural number between 4 and one half the number of pixels in a column) being combined with  $N$  gate electrode groups to reduce number of the external connection terminals.

2. A solid-state imaging device comprising:  
a pixel unit constituted by a two-dimensional array of pixels for generating charge in correspondence to received light and accumulating the charge for a predetermined period of time;

a vertical transfer unit for vertically

transferring charge from the pixels in the pixel unit, a horizontal transfer unit for horizontally transferring charge from the vertical transfer unit;

shift gates each provided between each pixel and the vertical transfer unit for reading out the charge in the pixels to the vertical transfer unit, gate electrodes for controlling the shift gates; and

a plurality of lead lines and a plurality of connection terminals for connecting the gate electrodes to an external circuit,

the gate control lines within successive pixel rows belonging to each coset of modulo  $N$  ( $N$  being a predetermined natural number between 4 and one half the number of pixels in a column) being combined with each other so as to reduce number of the external connection terminals.

3. A solid-state imaging device comprising:

a pixel unit constituted by a two-dimensional array of pixels for generating charge in correspondence to received light and accumulating the charge for a predetermined period of time;

a vertical transfer unit for vertically transferring charge from the pixels in the pixel unit, a horizontal transfer unit for horizontally transferring charge from the vertical transfer unit;

shift gates each provided between each pixel and the vertical transfer unit for reading out the charge in the pixels to the vertical transfer unit, gate electrodes for controlling the shift gates; and

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a plurality of lead lines and a plurality of connection terminals for connecting the gate electrodes to an external circuit,

the gate electrodes being provided in a predetermined number  $N$  ( $N$  being a predetermined natural number between 4 and one half the number of pixels in a column) of gate electrode groups such that horizontal line number of the gate electrode groups which are connected to respective common lead lines belong to each same residue class of modulo  $N$ , some of the gate electrode groups being commonly connected so that the connection electrodes are less in number than  $N$ .

4. A solid-state imaging device comprising: a pixel unit constituted by a two-dimensional array of pixels for generating charge in correspondence to received light and accumulating the charge for a predetermined period of time; a vertical transfer unit for vertically transferring charge from the pixels in the pixel unit, a horizontal transfer unit for horizontally transferring charge from the vertical transfer unit; shift gates each provided between each pixel and the vertical transfer unit for reading out the charge in the pixels to the vertical transfer unit, gate electrodes for controlling the shift gates; and a plurality of lead lines and a plurality of connection terminals for connecting the gate electrodes to an external circuit, the gate electrodes within successive pixel rows belong to each coset of modulo  $N$  ( $N$  being a predetermined natural number between 4 and one half

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the number of pixels in a column) being combined with N gate electrode groups to reduce number of the external connection terminals,

wherein the commonly connected gate electrode groups are always controlled in the same way in each of all predetermined read-out modes including selective pixel read-out modes by selective shift gate driving.

5. A solid-state imaging device comprising: a pixel unit constituted by a two-dimensional array of pixels for generating charge in correspondence to received light and accumulating the charge for a predetermined period of time; a vertical transfer unit for vertically transferring charge from the pixels in the pixel unit, a horizontal transfer unit for horizontally transferring charge from the vertical transfer unit; shift gates each provided between each pixel and the vertical transfer unit for reading out the charge in the pixels to the vertical transfer unit, gate electrodes for controlling the shift gates; and a plurality of lead lines and a plurality of connection terminals for connecting the gate electrodes to an external circuit, the gate control lines within successive pixel rows belong to each coset of modulo N (N being a predetermined natural number between 4 and one half the number of pixels in a column) being combined with each other so as to reduce number of the external connection terminals,

wherein the commonly connected gate electrode groups are always controlled in the same way in each of

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all predetermined read-out modes including selective pixel read-out modes by selective shift gate driving..

6. A solid-state imaging device comprising: a pixel unit constituted by a two-dimensional array of pixels for generating charge in correspondence to received light and accumulating the charge for a predetermined period of time; a vertical transfer unit for vertically transferring charge from the pixels in the pixel unit, a horizontal transfer unit for horizontally transferring charge from the vertical transfer unit; shift gates each provided between each pixel and the vertical transfer unit for reading out the charge in the pixels to the vertical transfer unit, gate electrodes for controlling the shift gates; and a plurality of lead lines and a plurality of connection terminals for connecting the gate electrodes to an external circuit, the gate electrodes being provided in a predetermined number  $N$  ( $N$  being a predetermined natural number between 4 and one half the number of pixels in a column) of gate electrode groups such that horizontal line number of the gate electrode groups which are connected to respective common lead lines belong to each same residue class of modulo  $N$ , some of the gate electrode groups being commonly connected so that the connection electrodes are less in number than  $N$ ,

wherein the commonly connected gate electrode groups are always controlled in the same way in each of all predetermined read-out modes including selective pixel read-out modes by selective shift gate driving.

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7. The solid-state imaging device according to one of claims 4-6, wherein gate electrode groups controlled in each of all the predetermined read-out modes are set such as to provide a minimum number of connection terminals for connecting the gate electrodes to an external circuit.